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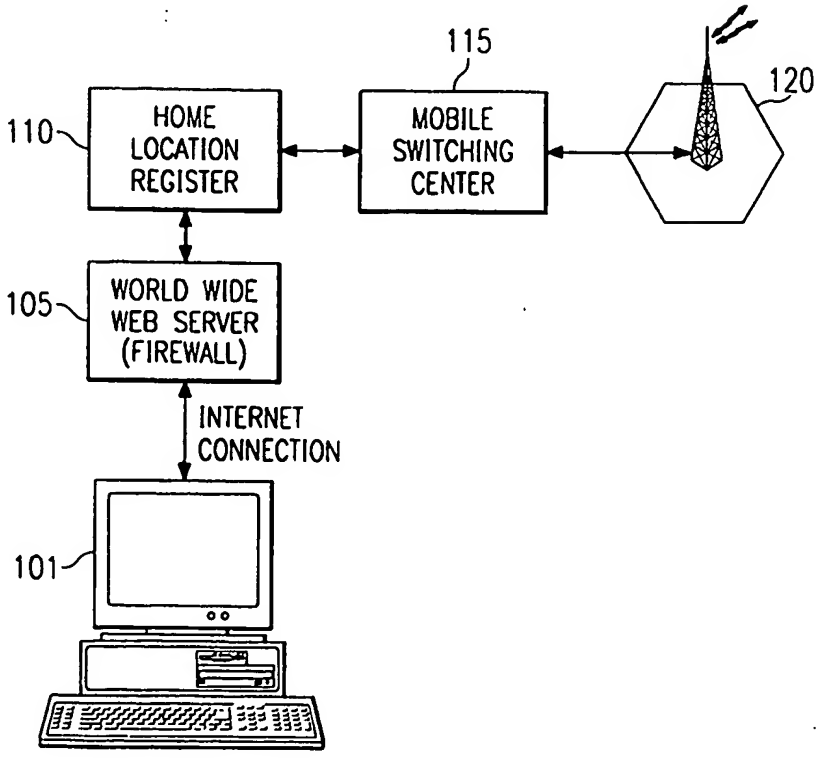
(54) Title: INTERNET PROFILE MANAGEMENT FOR RADIOTELEPHONE SUBSCRIBERS

(57) Abstract

The system and processes of the present invention enable Internet access to radiotelephone subscriber service profiles in a home location register. The subscriber logs on to a world wide web browser that validates identification information. The subscriber is then presented with various web pages that list the current profile and enable that profile to be changed. The updated profile is transmitted to the home location register for storage.



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INTERNET PROFILE MANAGEMENT FOR RADIOTELEPHONE SUBSCRIBERS

BACKGROUND OF THE INVENTION

I. FIELD OF THE INVENTION

The present invention relates to radiotelephone service. More particularly, the present invention relates to radiotelephone service profile management over the internet.

II. DESCRIPTION OF THE RELATED ART

As cellular radiotelephones are reduced in size to make them more convenient for consumers, in some cases, space availability for function keys is eliminated. Therefore, the various functions available through the radiotelephone are accessed through feature codes using the typical telephone keypad. For example, if a subscriber wants to access call forwarding, the function code may be *72.

As the number of features available to the subscriber increases, the management of these features by the subscriber becomes more complex. The subscriber may be paying for ten different features but cannot remember the access codes for all of the features.

Additionally, when a subscriber first subscribes for service through the service provider, an operator for the service provider must be familiar with all of the features available in order to make the subscriber aware of what is available. This requires time and money on the service provider's part to train these operators to sell the services.

There is a previously unforeseen need for a system that enables a subscriber to purchase various radiotelephone features from the service provider. There is also a need for a process to operate this system in an efficient manner.

SUMMARY OF THE INVENTION

EMSDOCID: <WO__9907106A2.1 >

The present invention encompasses a radiotelephone system that enables a subscriber to manage his radiotelephone service profile over the internet. The profile is comprised of selectable radiotelephone features that can include call forwarding, call waiting, conference calling, and short message service.

The system is comprised of a home location register database that stores the service profiles of the radiotelephones that are resident in the home location register. In the preferred embodiment, the home location register is coupled, through a computer server, to the internet that enables access to a subscriber's radiotelephone service profile.

The computer server acts as a firewall between the home location register and the internet. This prohibits access to the service profiles by unauthorized users.

A mobile switching center, coupled to the home location register, performs the radiotelephone features that have been selected by the subscriber. For example, if the subscriber selects call forwarding, the mobile switching center performs the related tasks to forward the incoming call to another location specified by the radiotelephone subscriber.

An internet access device, coupled to the computer server through the internet, accesses, displays, and selects the various radiotelephone features from the list of available radiotelephone features. In the preferred embodiment, this internet access device is a desktop computer that has a resident internet browser program.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 shows a block diagram of the profile management system of the present invention.

FIG. 2 shows a flowchart for the feature selection process of the present invention.

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FIG. 3 shows a block diagram of an alternate embodiment of the profile management system of the present invention.

FIG. 4 shows a profile management login page.

FIG. 5 shows a profile management feature selection page.

FIG. 6 shows another profile management feature selection page.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The processes and system of the present invention enables a radiotelephone subscriber to manage their own cellular radiotelephone service profile with the service provider. Using an internet access device, the subscriber can access his profile over the internet to make changes.

The system of the present invention is illustrated in FIG. 1. This system is comprised of an internet access device (101), a computer acting as a world wide web server device (105), a home location register (HLR) database (110), a mobile switching center (115), and a cell site (120) that includes a base station and antennas.

In the preferred embodiment, the internet access device (101) is a desktop computer running a world wide web access program referred to as a web browser. An example of a computer used in the present invention is one of the APPLE MACINTOSH line of computers. These computers run web browsers such as NETSCAPE NAVIGATOR and MICROSOFT EXPLORER. Other brands and types of computers and other web browsers may be used by the present invention.

Alternate embodiments use other types of internet access devices such as dedicated smart terminals that have the ability to access the internet. An example of such a dedicated terminal is a telephone that has a built-in display and web browser giving it the ability to access the internet.

In the preferred embodiment, the internet access device (101) is coupled to the world wide web server (105) through the internet. This is done using a modem and connecting to the internet using an internet

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service provider. Other embodiments use other connections to the internet such as an ISDN line that provides greater access speed.

The world wide web server (105) is another computer acting in a server mode that is well known in the art. Apple Computer, Inc. and International Business Machines, Inc. (IBM) are manufacturers of dedicated servers. Additionally, a desktop computer operating the proper software may be configured as a server.

The web server (105) acts as a firewall to the HLR (110), limiting access to authorized users who have the proper identification information. In the preferred embodiment, the server (105) performs the processes of the present invention, stores the web pages required by the processes, and sends the selected radiotelephone service features to the HLR (110). The operation of the server (105) is discussed subsequently in conjunction with the processes.

The HLR (110) is well known in the art. It is a database of profiles for all of the radiotelephones operating in a particular service provider's system. The profiles include the features purchased by the subscriber and the cellular service plan the subscriber has purchased. The service plan can include the price of the air time and the number of minutes covered by the monthly charge.

The web server (105) and the HLR (110), in the preferred embodiment, are coupled by a provisioning interface. This interface enables the server to transmit the selected service features to the HLR (110) in a standard protocol form or a delimited form such as using a comma, tab, or other delimiter.

An alternate embodiment of the present invention couples the web server (105) and the HLR (110) by other types of interfaces. For example, an IS-41 or ethernet interface could be used, both well known in the art.

The mobile switching center (MSC) (115) is also well known in the art. The MSC (115) is responsible for routing calls from the public switched telephone network (PSTN) to the appropriate cell site (120) communicating with the subscriber's radiotelephone. The MSC (115) also

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performs the reverse task of routing a call from the radiotelephone to the PSTN.

The MSC (115) additionally performs the switching required by any of the features selected by the subscriber. Assume, for example, that the subscriber has purchased call forwarding. The subscriber enters into their radiotelephone the telephone number to which all incoming calls are to be forwarded. This information is transmitted to and stored in the HLR. When a call is received for the subscriber's radiotelephone number, the MSC finds the forwarding number in the profile provided by the HLR and routes the call to the PSTN, or other MSCs. The destination depends on the forwarding number.

FIG. 2 illustrates the process followed by the subscriber to manage his profile. This process is described with reference to FIGs. 4-6.

Assuming the web browser program is running, the subscriber accesses the service provider's profile management home page (step 201). An example of such a page is illustrated in FIG. 4. This page is also referred to as the login page.

The home page includes areas for entering subscriber identification information. In the preferred embodiment, this information includes the cellular radiotelephone's assigned telephone number (401) and a passcode (405)known only to the subscriber. This passcode may be numeric, alphabetic, or alphanumeric.

Once the identification information is entered (step 205), the subscriber clicks on the enter key (410). If the information was not entered correctly, the reset key (415) may be used to clear the entries to allow re-entry of the information.

In the preferred embodiment, the identification information is validated (step 210) by the web server. The validation process is accomplished by the server comparing from a table, stored in memory or on a drive, the radiotelephone number with a passcode. If the radiotelephone number and passcode from the table is the same as the

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identification information entered by the subscriber, access to the profile management system is granted.

Once access is granted, a window (not shown) within the web page of FIG. 4 announces the successful access. If the radiotelephone number and passcode do not match, this is announced and another chance is given to enter the proper information.

The main profile management page additionally presents the subscriber with a menu of options. After successful access to the system, these buttons are enabled allowing the subscriber to choose an option (step 215).

In the preferred embodiment, these buttons are for a Home Page (455), Updating a Profile (420), Request Passcode (425), Try Before U Buy feature (430), Send Short Message (435), Available Features (440), and Help buttons (445 and 450). Not all of these buttons are subsequently discussed since some of the functions are well known by those skilled in the art. Additionally, the present invention is not limited to the buttons/functions shown in FIG. 4. Alternate embodiments have buttons for other functions not illustrated.

As an example of one function, if the "Update Profile" button (420) is activated, the web page illustrated in FIG. 5 is opened. This page shows the present service plan and features to which the subscriber has subscribed. By clicking on the appropriate boxes/buttons with the cursor, the subscriber can change his service plan including: rates, long distance carrier, and access to roaming. Additionally, basic features can be added or removed from the subscriber's profile by activating the appropriate box or button. Alternate embodiments list other features and use different formats.

Some features have sub-functions, as illustrated in FIG.6, that also may be changed by the present invention. For example, if call forwarding is activated, another web page is displayed that illustrates information needed for call forwarding, such as: unsolicited calls received, the telephone is busy, there is no answer by the subscriber. In all of these

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cases, the subscriber can alter his profile by simply activating the appropriate button/box.

Another example of a function from the home page is the Try Before U Buy (430) function. This function enables the subscriber to try out a feature or service before being billed for it.

For example, if the subscriber wanted to find out if the call waiting feature would be useful as part of his service, he would activate the Try Before U Buy button (430), illustrated in FIG. 4, that would bring up the same web page illustrated in FIG. 5. The difference is that the features and services are not charged to the subscriber's account for a predetermined time. This time gives the subscriber a chance to try the features before actually purchasing them.

If, after the predetermined time, the subscriber doesn't re-enter the web page and make the new features permanent, the features are turned off. However, if the subscriber desires these features, the web pages can be re-accessed and the features added to the account.

Referring again to FIG. 6, if a mistake is made during the entry of any of the above changes, the subscriber can activate the Reset button (601) to clear out any changes and return to the original profile. Once the subscriber has correctly altered his profile as needed, the Submit button (602) is activated.

Activation of the Submit button (602) informs the web server to format the new profile into the appropriate delimited format. The preferred formatting is done using a protocol. Other embodiments use some type of delimiting such as tabs or semicolons. The profile is then submitted to the HLR over the provisioning interface for storage (step 220) and use by the MSC.

FIG. 3 illustrates an alternate embodiment of the system of the present invention. This embodiment is similar to the preferred embodiment except for the addition of the billing server (301).

In this embodiment, the billing system (301) is a billing server computer that performs a billing process. This process includes tracking

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the subscriber's service plan and air time rates, tracking the subscriber's air time, and tracking the features that the subscriber has chosen. All of these factors enter into the bill that the subscriber receives. Therefore, if the subscriber changes his profile, the billing system must know in order to change the billing for the subscriber.

Also in the alternate embodiment of FIG. 3, all of the validation of identification and credit is done by the billing server. Thus, once the subscriber enters the identification data into the login page, this information is sent to the billing system where it is validated.

The billing system (301) is coupled to the world wide web server (305) and the HLR (310) by ethernet connections. Other embodiments couple these blocks by other forms of connections, such as radio frequency or microwave, thus allowing the billing system (301) to be removed from the other blocks by greater distances.

In summary, the system and processes of the present invention permit radiotelephone service profile management over the internet. This allows the subscriber to update his profile quicker and at any time of the day without operator interaction.

WE CLAIM:

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CLAIMS

1. A radiotelephone system for providing a plurality of selectable radiotelephone service features, configurable by an internet access device, for use by a radiotelephone, the system comprising:

a home location register database comprising a profile of various radiotelephone service features, of the plurality of selectable radiotelephone service features, available to the radiotelephone;

a mobile switching center, coupled to the home location register database, for performing the selected radiotelephone features; and

a server device, coupled between the internet and the home location register database, for limiting access to the radiotelephone system.

2. The system of claim 1 and further including a billing system, coupled to the home location register database and the server device, the billing system tracking the financial information of a radiotelephone subscriber.

3. The system of claim 1 wherein the internet access device is a desktop computer operating with an internet browser.

4. A radiotelephone system for providing a plurality of selectable radiotelephone service features for use by each radiotelephone of a plurality of radiotelephones assigned to that system, the system comprising:

a home location register database comprising a profile of selected radiotelephone service features, of the plurality of radiotelephone service features, that are available to each radiotelephone;

a computer server, coupled between an internet connection and the home location register database, for restricting access to the database from the internet;

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an internet access device having a display and keypad for accessing, displaying, and selecting the various radiotelephone service features from the plurality of radiotelephone service features;

a billing system server, coupled to the computer server and the home location register database, the billing system server tracking service billing information for the radiotelephone in response to the profile of selected radiotelephone service features; and

a mobile switching center, coupled to the home location register database, for performing the selected radiotelephone service features.

5. A method for managing a radiotelephone service profile comprising selected radiotelephone service features from a plurality of available radiotelephone service features, the method comprising the steps of:

connecting, through an internet connection, to a database that stores the plurality of available radiotelephone service features;

accessing the plurality of available radiotelephone service features;

selecting a radiotelephone service feature from the plurality of available radiotelephone service features; and

saving the selected radiotelephone service feature in the radiotelephone service profile.

6. The method of claim 5 wherein the step of connecting includes entering a radiotelephone number and a password to verify identification of a subscriber.

7. The method of claim 5 and further including the step of verifying the subscriber's consumer credit information before saving the radiotelephone service profile.

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8. A method for managing a radiotelephone service profile comprising selected radiotelephone service features from a plurality of available radiotelephone service features, the method comprising the steps of:

providing an internet page comprising a logging-in of identification information;

verifying validity of the identification information;

providing an internet page comprising the plurality of available radiotelephone service features, each feature being selectable; and

storing the selected radiotelephone service features in the radiotelephone service profile.

9. The method of claim 8 wherein the identification information includes a radiotelephone number assigned to the radiotelephone and a password.

10. The method of claim 8 wherein the step of providing includes providing a radiotelephone service feature that is a function of a time of day.

11. The method of claim 8 wherein the step of providing includes providing a radiotelephone service feature that permits a temporary service trial.

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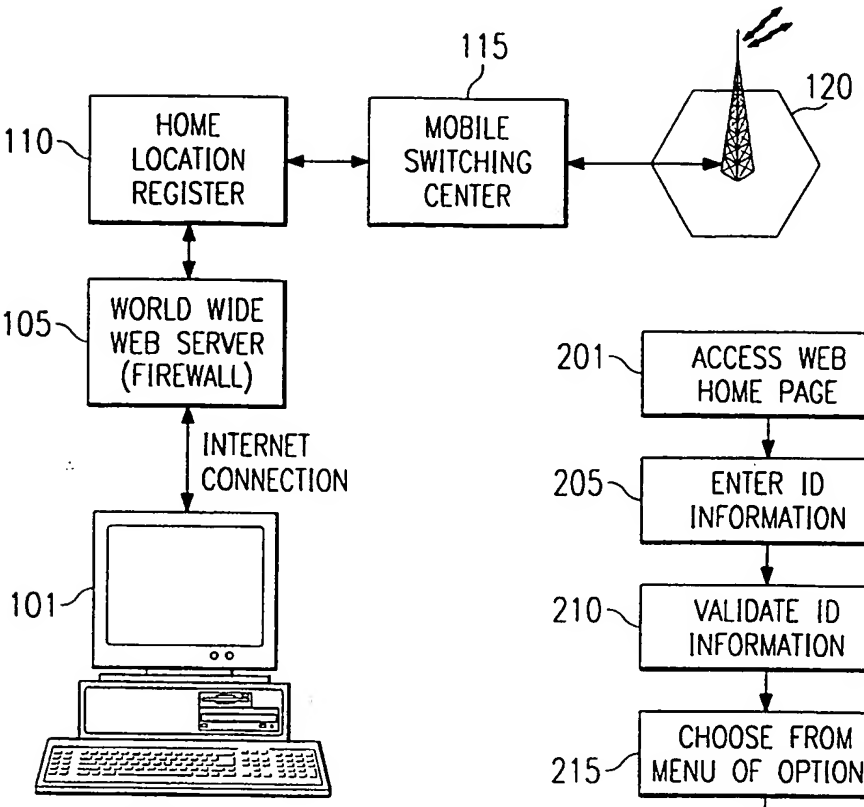


FIG. 1

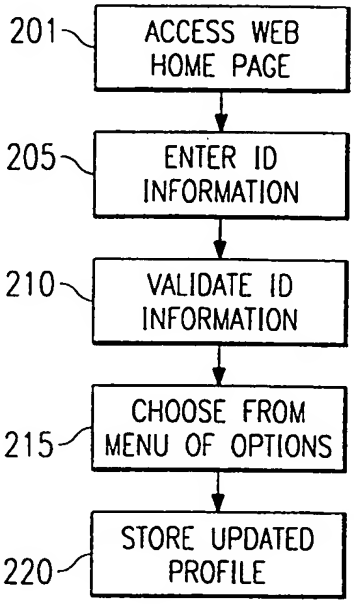


FIG. 2

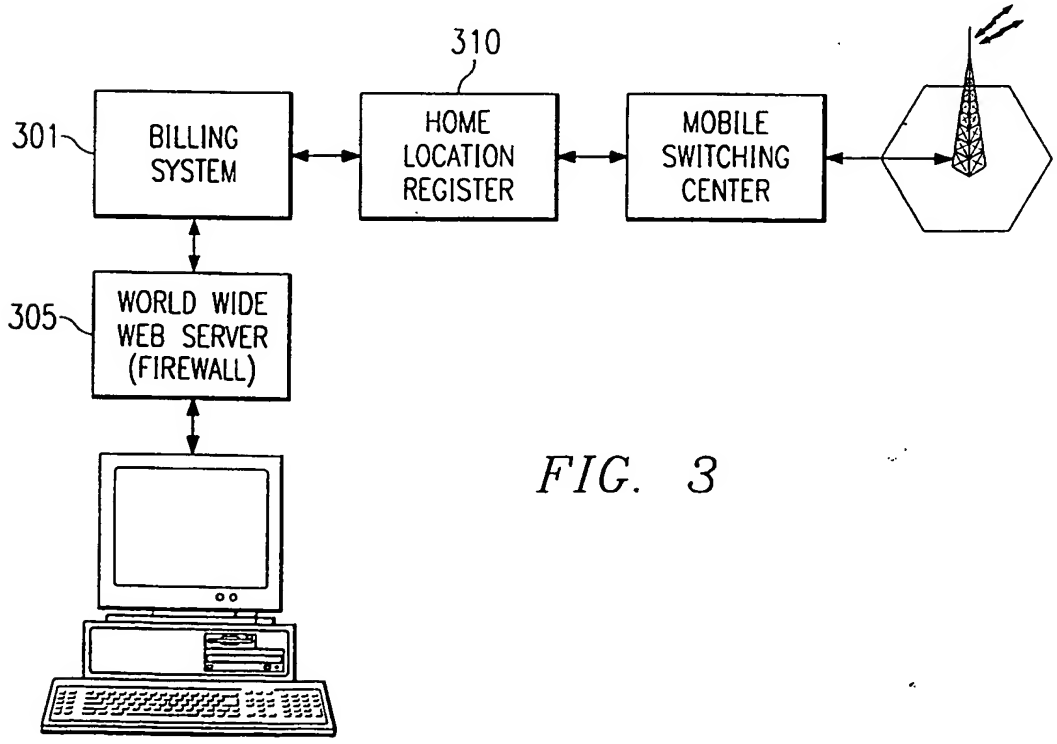


FIG. 3

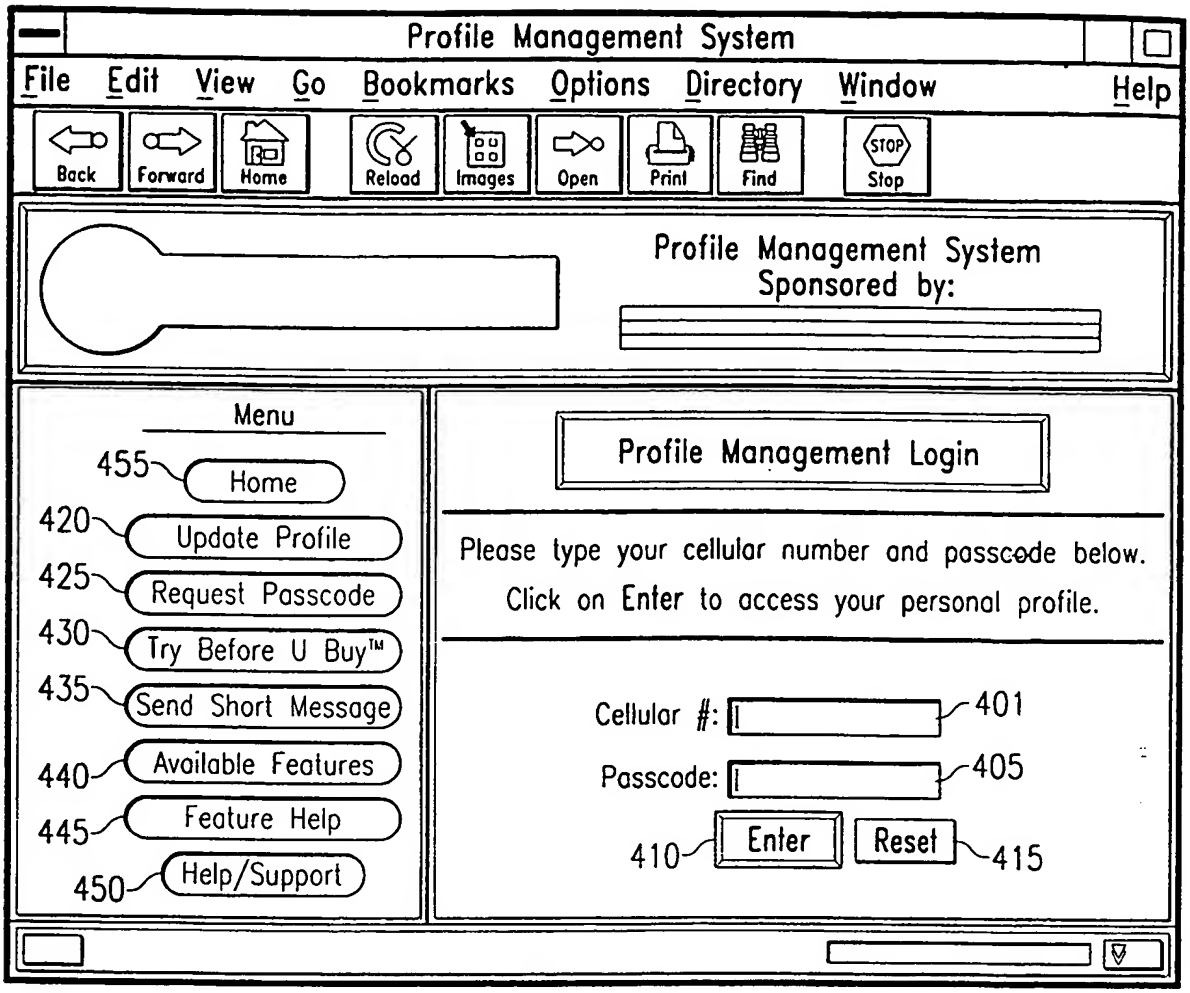


FIG. 4

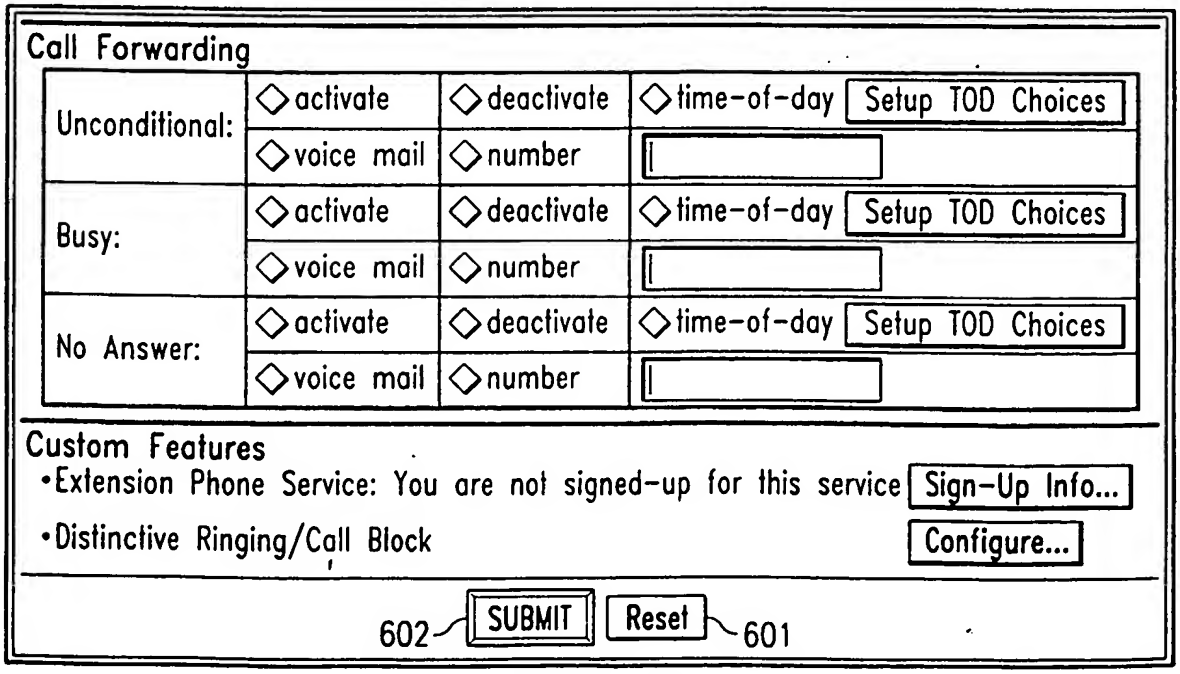
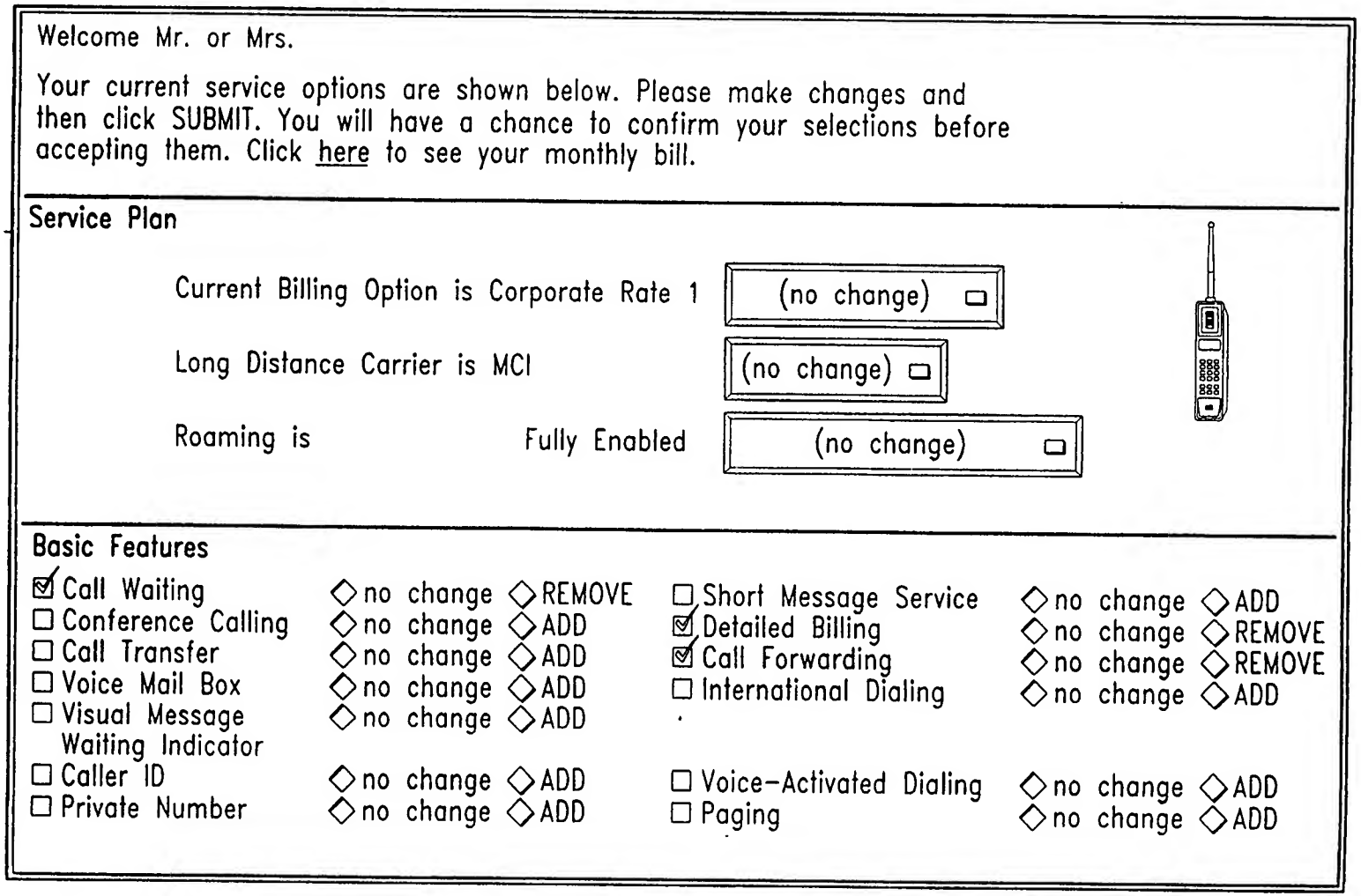


FIG. 6

SUBSTITUTE SHEET (RULE 26)


Welcome Mr. or Mrs.
Your current service options are shown below. Please make changes and then click SUBMIT. You will have a chance to confirm your selections before accepting them. Click here to see your monthly bill.
Service Plan
Current Billing Option is Corporate Rate 1
(no change)
Long Distance Carrier is MCI
(no change)
Roaming is
Fully Enabled
(no change)
Basic Features
Call Waiting
no change
REMOVE
Conference Calling
no change
ADD
Call Transfer
no change
ADD
Voice Mail Box
no change
ADD
Visual Message Waiting Indicator
no change
ADD
Caller ID
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Private Number
no change
ADD
Short Message Service
no change
ADD
Detailed Billing
no change
REMOVE
Call Forwarding
no change
REMOVE
International Dialing
no change
ADD
Voice-Activated Dialing
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Paging
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ADD

FIG. 5

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(74) Agent: BOLVIN, Kenneth, W.; Northern Telecom, Patent Dept., P.O. Box 832130, Richardson, TX 75083-2130 (US).

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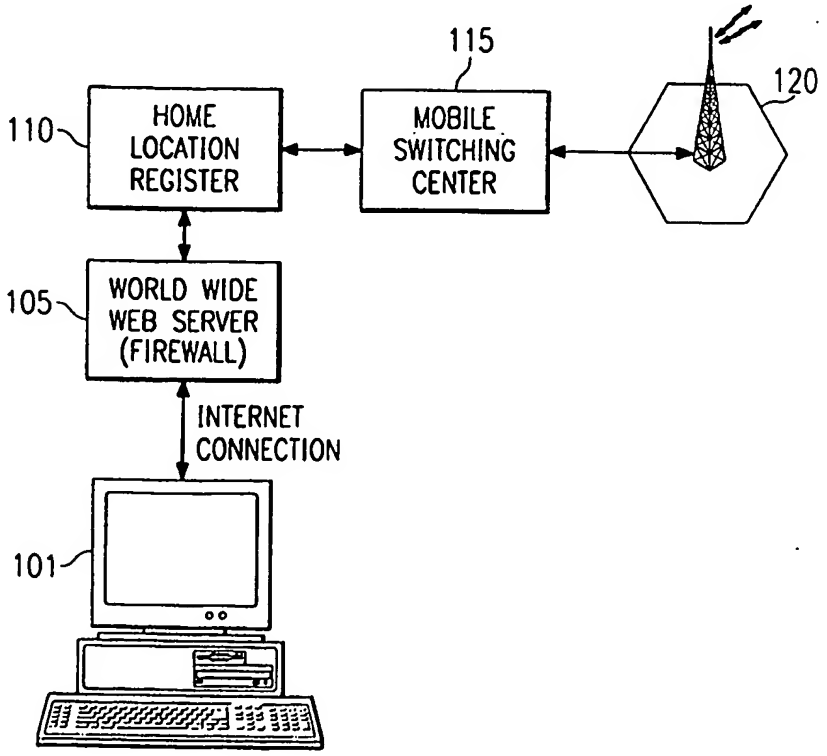
(57) Abstract

The system and processes of the present invention enable Internet access to radiotelephone subscriber service profiles in a home location register. The subscriber logs on to a world wide web browser that validates identification information. The subscriber is then presented with various web pages that list the current profile and enable that profile to be changed. The updated profile is transmitted to the home location register for storage.



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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER
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According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 H04Q H04M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 95 21509 A (ERICSSON TELEFON AB L M ;GANDILS MATS WERNER (SE); LANTTO SVEN JOE) 10 August 1995 Summary of the invention see page 19, line 10 - line 29 claims	1-9
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P,X	WO 97 44943 A (MATTILA ARI PEKKA ;HALME PETRI (FI); TOEHOENEN HARRI (FI); FINLAND) 27 November 1997 see the whole document	5,8,9

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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
28 January 1999	05/02/1999

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Dionisi, M

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INTERNATIONAL SEARCH REPORT

Inter nal Application No
PCT/US 98/14827

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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